Advanced Fuel Cycle Initiative (AFCI):
International Fuel Programs

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There are a number of International programs of interest

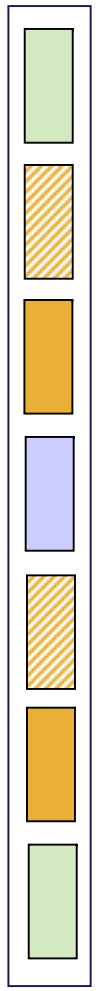
- FUTURIX
- CONFIRM
- MILE
- Japanese programs
- Russian Programs

FUTURIX is a Phenix irradiation collaboration between DOE, CEA, ITU and JAERI

- 8 fuel pins will be irradiated in Phenix in 2006-2008 timeframe.
- DOE will supply
  - Non-fertile and low-fertile metal fuel pellets (ANL-W)
  - Non-fertile and low-fertile nitride fuel pellets (LANL)
- CEA will supply CERCER fuels ((Pu,Am)oxide in MgO matrix)
- ITU will supply CERMET fuels ((Pu,Am)oxide in Mo matrix)
- ITU will fabricate the fuel pins
- DOE cash contribution ~3 M Euros over 5 years (~40-45% of total cost)
- JAERI will contribute
  - 10% of total cost
  - Access to nitride data only
  - Provide the Japanese nitride data-base to DOE
- **Coordination, technical and QA review meetings continue**
  - Detailed integrated schedules developed including information exchange requirements
  - Contract expected to be signed in the next few months

MILE is a proposed joint program on Pu inert matrix fuel utilization in LWRs using a zirconia based inert matrix fuel

- MILE: Mastering IMF in LWR Environment
- Previously, PuO_2 - ZrO_2 fuels have been successfully tested
- The objective is to test such fuels in an actual power reactor (LWR) Fuel form:
  - PuO_2 - ZrO_2 (solid solution)
  - Stabilized by Y_2O_3
  - Er_2O_3 used as burnable poison
- Proposed by PSI/ITU
- Requesting 1 M Euros contribution from DOE over 3-4 years
- Potential reactor BEZNAU
  - irradiations starting after 2005 and lasting ~4 years
- Meeting in October 2003.



Fuel pin in a MOX assembly divided into 7 segments

CONFIRM is a European Program studying Nitride Fuels for Transmutation Applications

- COMFIRM: Collaboration On Nitride Fuel Irradiation and Modeling
- Objective is to develop, model, fabricate and irradiate a fertile-free transmutation fuel as a backup to the European reference oxide fuel.
- Supported by EC with partnership among AEA-T, BNFL, CEA, ITU, KHT, PSI and Studsvik Reactor.
- Fabrication of (Pu, Zr)N and (Am, Zr)N (2002, 2003)
- Irradiation of (Pu, Zr)N in Studsvik reactor (2003 ?)
- No financial contribution requested from DOE
  - Collaboration at the level of information exchange is useful

International collaboration is essential in implementing the near-term and long-term U.S. program as envisioned

- FUTURIX collaboration progressing very well
  - Contract signing and initial payment in FY'04 is needed to remain on schedule
  - "in-kind" Am shipment to CEA/ITU is done.
- MILE collaboration is strongly recommended for quickly and economically incorporating the IMF option into the U.S. program
- CONFIRM collaboration is ongoing informally but a formal arrangement under the EU umbrella is recommended.
- It is important to start a formal collaboration with Japan SOON
  - A lot of fundamental data on various fuel forms for transmutation collected through ~10 years of fundamental studies
  - Potential for future fast reactor irradiation (JOYO, MANJU)
- Collaboration with Russia must also be considered
  - Emphasis on future irradiation in BOR60

U.S has no fast spectrum irradiation capability